

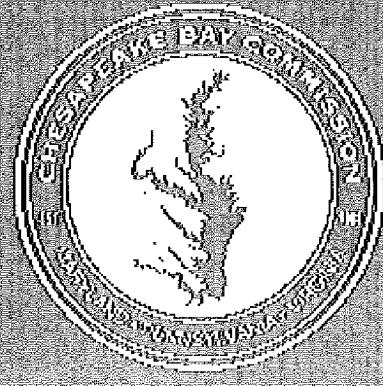
## **APPENDIX 47**

# Cost-Effective Strategies For the Bay

6

*Smart Investments  
for Nutrient and  
Sediment Reduction*

DECEMBER 2004



AR0037893

## Transport and Alternative Uses for Excess Manure

Across the watershed, in areas where confined animal operations are concentrated, we are seeing the production of more manure than local cropland and pastureland can assimilate. The challenges of manure management will only intensify as new federal regulations addressing concentrated animal feeding operations are implemented. Under the EPA regulations, some large livestock and poultry producers would have to meet either a nitrogen-based or phosphorus-based application standard, depending on local soil conditions. By seeking to more precisely match fertilizer application with actual crop needs, nutrient management planning and precision agriculture will result in greater volumes of manure requiring transport and alternative uses. For example, although manure is typically spread year round, optimal use of its nutrients occurs only during the growing season, and fall/winter application has been pinpointed as a major source of nutrient pollution.

Several obstacles stand in the way of widespread use of manure on cash-crop or other "green industry" operators. Historically, farmers without their own supply of manure, and even some who do, have looked to chemical fertilizers to replenish soil nutrients rather than use manure. This is because manure is not a standard agricultural product. The levels of nutrient content, nutrient concentration and odor can vary greatly between sources of manure, and even over time from the same source.

- Due to its high moisture content and associated weight and volume, transportation costs represent another limiting factor, making transportation over long distances impractical. Further, aggravating this limitation is continued urban sprawl. As traditional farming communities are increasingly encroached upon by urban development, eligible fields for manure application become farther and further apart. This further increases transportation costs or prevents transportation altogether.

There are two approaches to increasing the desirability of manure as a nutrient source on all farms. The first is to decrease the levels of nutrients in the manure through adjustments to diet and feed, allowing more to be applied on the same acreage; the second is to process the manure into a standardized product that is concentrated, stable and has a reliable nutrient content.

The first approach is discussed in detail on page 8. Regarding the second approach, some progress has been made to explore the feasibility of processing alternative uses of manure. The USDA estimates that alternative

uses could process as much as 370,000 tons, or 65 percent of the poultry litter produced in the Shenandoah and Delmarva regions, by 2010. Much of the work has focused on poultry manure, due to its relatively low moisture content and weight.

One example of a current project is the Perdue Avi-Raise plant on the Delmarva Peninsula. At that facility approximately 60,000 tons per year are being pelleted for use on golf courses, sports fields, specialty horticultural crops and other uses. However, the estimated transportation costs are \$10/ton, even within a 25-mile radius. Currently, Maryland and Delaware provide assistance and/or subsidies for manure transportation. If transportation costs can be lowered, processing of manure can be a viable option. The USDA study indicated that the annualized costs of building the processing facilities are often less than the cost of land application.<sup>1</sup>

The economic feasibility of industrial processing of livestock wastes remains unresolved. Technologies exist to reduce moisture content and transform the manure into a more homogeneous and stabilized fertilizer product. Biogasifiers and other uses of biomass as fuel present additional opportunities. As a further indication of the need to expand and refine processing and transportation efforts, the craft brewery strategies for Maryland, Delaware and West Virginia anticipate transporting some portion of their states' poultry litter to areas outside the watershed. The need for answers becomes even more immediate as new requirements for phosphorus-based fertilizers further limit manure application to land.

Clearly, there is a need to adjust land application practices throughout the watershed to ensure that manure is only applied according to crop needs. These adjustments can only occur with enhanced research and funding to provide a more formal, regional transportation and marketing structure and to produce consistent, standardized products.

The important role that agriculture plays in the cultural and economic landscape of the Chesapeake Region requires us to further explore the technologies that will enhance the viability of that industry and benefit the environment. This includes technologies such as feed additives or manure processing that will reduce farmers' input costs and increase the beneficial utilization of manure produced in the region while reducing excessive use of chemical fertilizers. In order for these to be feasible options, current research and pilot projects will need to be expanded in size and beyond the scope of poultry.

<sup>1</sup>USDA, "A Preliminary Assessment of the Feasibility of Processing Poultry Litter," December 2003.

**FIGURE 4**  
ANNUAL BAYWIDE NUTRIENT AND SEDIMENT REDUCTION POTENTIAL  
FOR THE SIX MOST COST-EFFECTIVE MEASURES

MEASURES	NITROGEN			PHOSPHORUS			SEDIMENT		
	M. lbs.	\$/lb.	M. lbs.	\$/lb.	M. tons	\$/ton			
1. Waste Treatment Upgrades	35.0	8.56	Data under dev.	3.00	74.00	n/a	n/a	n/a	n/a
2. Diet and Feed Changes			0.22	0.00					
3. Nutrient Management	13.6	1.56	0.80	28.26	n/a				
4. Enhanced Nutrient Mgmt.	23.7	4.40	0.20	55.79	n/a				
5. Conservation Tillage	12.0	1.57	2.59	—	1.68	—			
6. Cover Crops	23.3	3.13	0.24	—	0.22	—			
			n/a	n/a	n/a	n/a	n/a	n/a	n/a
							— = No additional cost		

**IMPLICATIONS**

Total potential reductions for nonpoint sources (2-6) at the edge of field = 1.35 m tons.

Total potential reductions for nonpoint sources (2-6) delivered to the Bay = 0.90 m tons.

Total potential reductions for all six practices (1-6) delivered to the Bay = 0.90 m tons.

Bay Agreement reduction goal (2002-2010) = 0.90 m tons.

\*The "reductions attributed to each agricultural practice are less when combined with other practices on the same land (see sidebar on pages 7). Therefore, the expected total reduction from combining agricultural practices is less than their sum.

\*\*Agricultural reductions are measured at edges of field and are reduced by the time they reach the Bay; this results in total reductions in loadings from those six practices to the Bay as indicated. Waste treatment plant reduction estimates are as delivered to the Bay.

conservation tillage refers to planting crops with minimal cultivation of the soil and retaining cover crops and crop residues that cover a minimum of 30 percent of the field. While this provides some nitrogen reduction benefits, more important, it is the single most beneficial agricultural management practice for both phosphorus and sediment control (see Figure 4), providing 38 percent of the phosphorus reduction and 100 percent of the sediment reduction needed Baywide. Conservation tillage includes:

- No-till, in which no plowing of the soil takes place and crop seeds are planted through perennial residue cover.
- Strip-till, in which narrow planting strips are